



Cost of Forward Contracting Wheat in Kansas

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Farmers looking to eliminate pre-harvest price risk can choose between using the futures market and forward contracting. Their choice is likely to be influenced by the relative cost of these two alternatives. The cost of hedging includes margin expenses, liquidity costs, brokerage fees, and added paperwork. The cost of forward contracting is not as easily measured, but is typically defined as receiving a wider implied basis (difference between local cash price and futures contract price) for contracted bushels relative to expected or historic harvest basis levels. In both cases, the realized costs cannot be fully measured until after harvest in order to compare expected and realized basis levels. The purpose of this fact sheet is to highlight recent patterns in wheat forward contracting costs and to highlight key findings of corresponding recent research.

Background on Forward Contracting and Historical Patterns

A discussion of the relative costs of hedging and forward contracting must begin with an explanation of the nature of the risk exposure to the farmer from each choice. Use of the futures market to hedge grain will eliminate downside price risk, but the hedger remains exposed to basis risk. A short hedge only offers full coverage of a cash position if the actual basis when the hedge is lifted equals the expected value of the basis when the hedge is placed. Basis risk in this case implies either a wider harvest basis (net loss to the farmer) or a narrower harvest basis (net gain to the farmer).

On the other hand, entering into a forward contract offered by the local elevator allows the transfer of both futures price risk and local basis risk. The remaining risk is a combination of production risk (having a crop to deliver) and any difference between the forward contract price and the price paid by crop insurance in the event of crop loss.¹ Elevators commonly deal with this transfer of risk by taking an offsetting short position in the futures market for the bushels they have agreed to purchase.

¹ If a farmer does not have a sufficient harvest to cover contracted bushels, in most cases, they purchase grain on the open market to fill the contract. If the market price for grain is higher than the price on which their crop insurance indemnity is based, they will incur a loss of the price difference.

Elevators are willing to offer/guarantee a harvest price to farmers (and accept the basis risk on the offsetting hedge) in exchange for a fee, which we call a risk premium. This risk premium charged by elevators is the cost of forward contracting farmers can expect to pay. How do elevators determine the risk premium they charge on forward contracts? If the source of the risk they face by forward contracting wheat is a function of basis risk on their hedged grain, then the volatility of basis in their area will affect forward contract risk premiums. That is, as volatility increases, elevators likely will charge a higher fee (i.e., increase the risk premium) to guarantee a harvest-time price prior to harvest.

The volatility of basis for wheat in Kansas has dramatically increased in the past five years relative to historic levels. Figure 1 shows the average nearby basis for wheat at four Kansas locations: Beloit, Garden City, Hutchinson, and Emporia. Visual inspection of the chart suggests that in the period January 2005 to the fall of 2007, basis generally followed a seasonal pattern with an average basis across all four locations of $-\$0.240/\text{bushel}$. The standard deviation of the basis at these locations during the time period was $\$0.203/\text{bushel}$. In the fall of 2007 (marked by the red vertical lines), the pattern shifts noticeably, with an average basis of $-\$0.688/\text{bushel}$. The

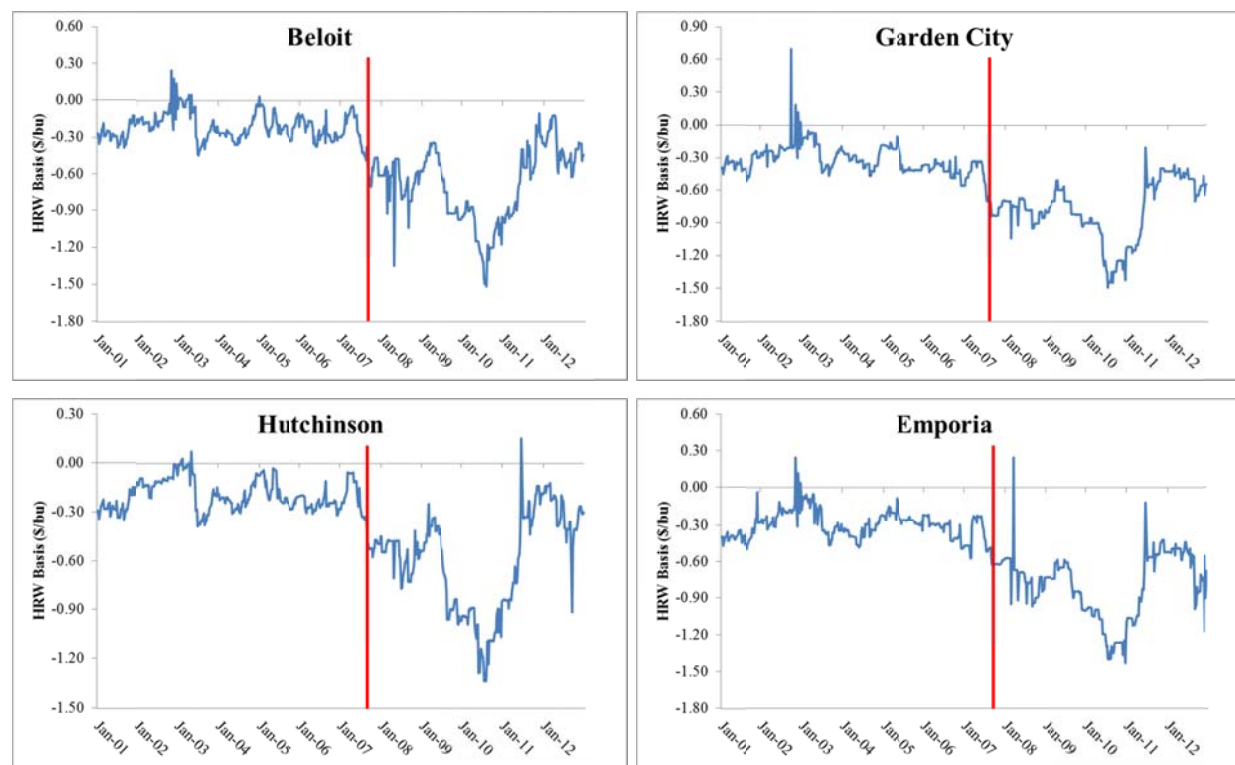


Figure 1. Nearby Wheat Basis at Four Kansas Locations (Jan. 2001 – Jan. 2012)

standard deviation of the basis increased to \$0.362/bushel. The implications of this shift in volatility of local wheat basis include reduced accuracy of basis forecasts and increased risk from unexpected movements in the basis for hedgers.

Higher basis volatility means it is more difficult for elevators to accurately forecast the harvest wheat basis in their area. To establish the price a forward contract to offer to producers, they must determine their expectations for the harvest basis. If they are wrong, and the risk premium they charge is insufficient to cover the difference, then elevators can lose money on their forward contracted wheat bushels. This exact situation happened in 2010, when a lack of basis convergence caused elevators in the state to lose an average of \$0.22/bushel on forward contracted wheat (see figure 2). The following year, elevators attempted to make up for those losses and prevent future ones by charging an average of \$0.83/bushel for forward contract wheat (O'Brien and Barnaby 2010).

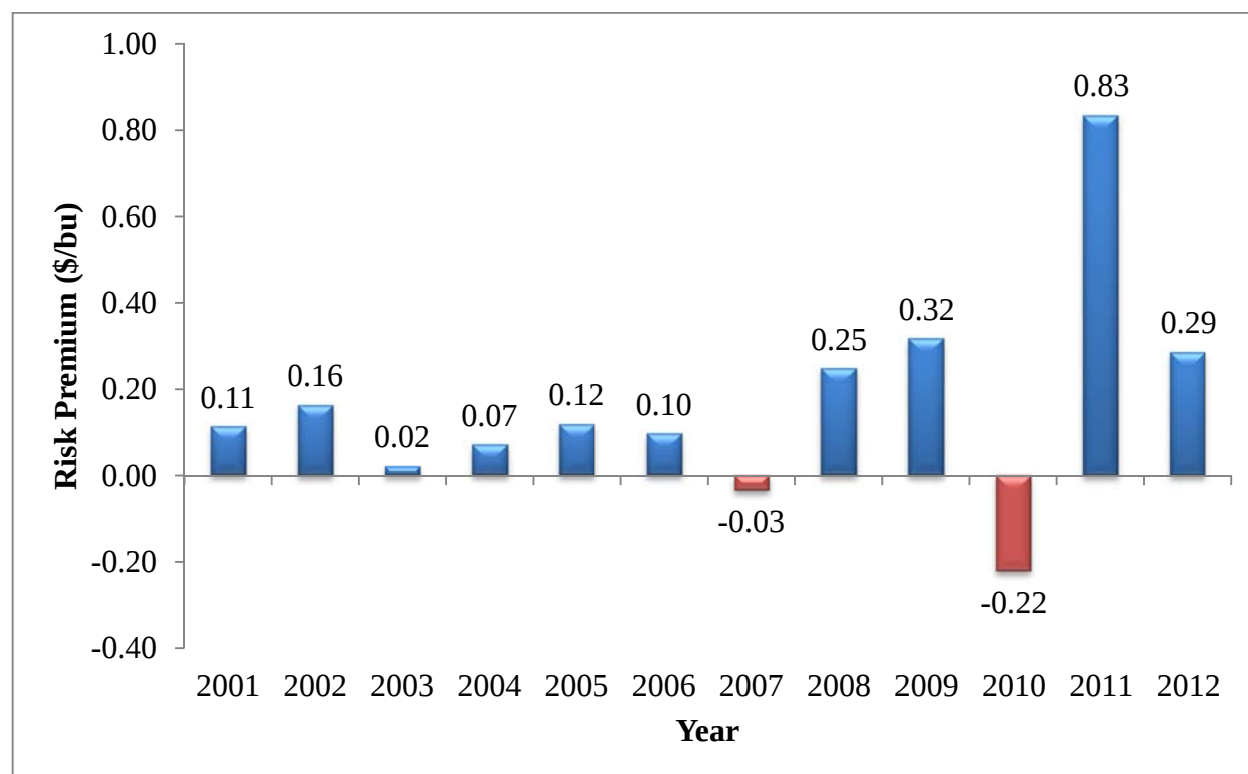


Figure 2. Average risk premium on forward contracted wheat in Kansas (2001-2012)

Previous research has estimated the risk premium on forward contracts for wheat in the Great Plains to range between six and nine cents a bushel (Townsend and Brorsen 2000; Taylor, Dhuyvetter and Kastens 2003). These estimates of the risk premium use data collected prior to the fall of 2007, thereby reflecting a period of relatively stable basis levels. Given the dramatic increase in basis volatility over the past five years, an updated estimate of the cost of forward contracting is warranted.

Data

The data used in this analysis were collected from 18 elevators located across the state of Kansas. The locations were selected based on two criteria: geographic diversity and consistency of availability of forward contract bids. Figure 3 presents the locations from which forward contract bids were collected. The bids were collected each Wednesday from 2001 to 2012 during the months of January through June.² The exact numbers of weeks forward bids are offered prior to the harvest period varies from year to year. Harvest was set as the 4th week of June which, in a typical crop year, will coincide with the majority of Kansas wheat having been harvested.

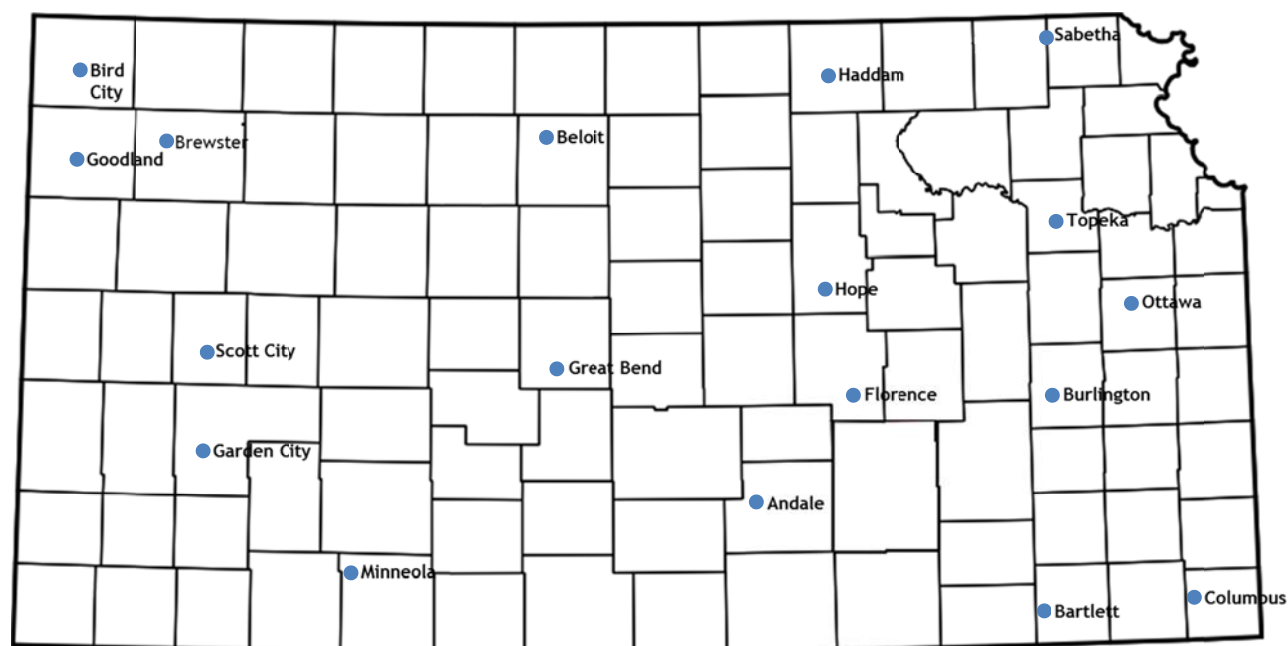


Figure 3. Grain Elevator Locations in Kansas

² If a Wednesday bid was not available due to a holiday, the Thursday bid was collected.

Results

The estimated cost of forward contracting, obtained by using a statistical model of risk premiums across the two periods analyzed, is \$0.086/bushel for the years 2002 to 2007. The cost increased dramatically to \$0.327/bushel for the period 2008 to 2012. It appears that the increase in observed volatility of the basis since 2007 has correspondingly increased the cost of forward contracting to farmers nearly four-fold. Based on a forward contract of 5,000 bushels of wheat, the total risk premium paid would have been between \$430 during the years 2002 to 2007. That risk premium increased to \$0.327/bushel or \$1,635 per contract in the years since 2007.

Conclusion

Basis is historically more stable than both cash and futures prices, which allows farmers and elevators to hedge the price of wheat with little risk of adverse basis movements. Starting in late 2007, an increase in volatility of the Kansas wheat basis occurred with implications for wheat hedging and forward contracting. A shift in basis risk exposure increased the costs of forward contracts for both farmers and grain elevators. The cost incurred by farmers from forward contracting has taken the form of a wider implicit basis bid. It is important to also recognize the costs of forward contracting for elevators have also increased.

It appears that increased basis volatility causes greater risk exposure for both farmers and elevators. As such, the cost of forward contracting has increased. Unless basis volatility returns to levels seen prior to 2007, these higher costs are likely to remain in the foreseeable future.

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